

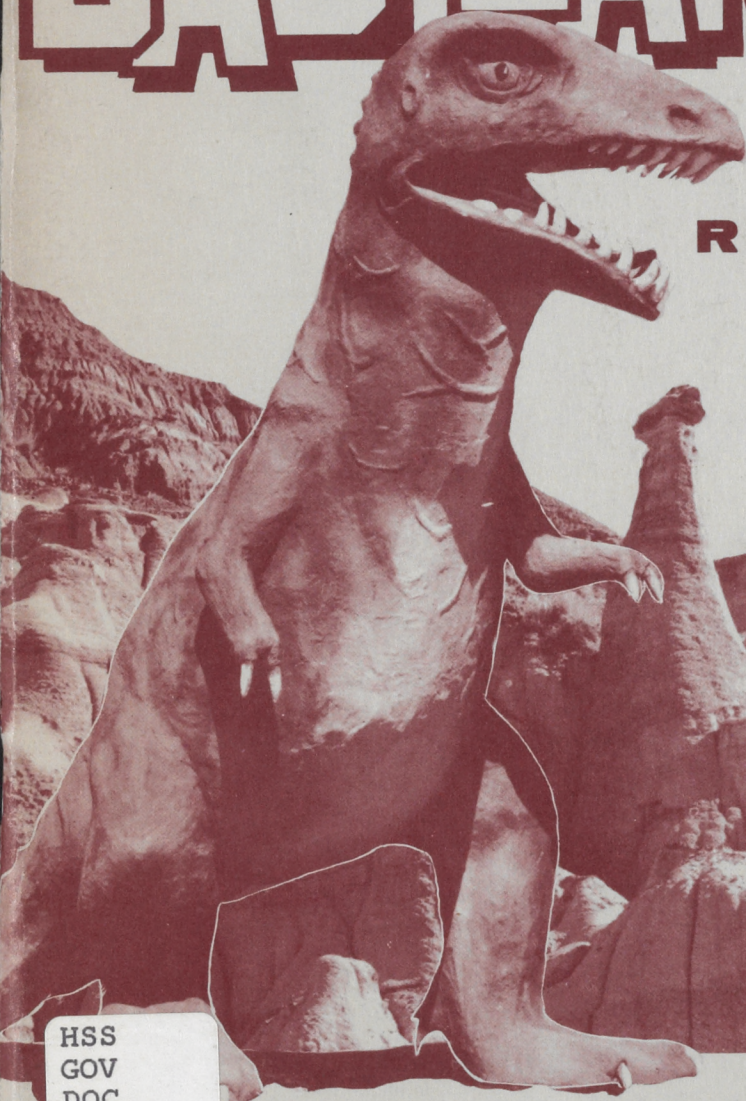
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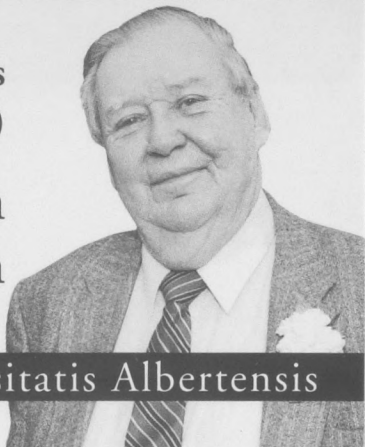
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## **WELCOME FROM THE MAYOR**

As Mayor of the City of Drumheller, I wish to express a sincere welcome to visitors to this City and district. In expressing this wish I not only speak for myself but also for the members of City Council and all residents of this Valley.

We are proud of the scenery of the surrounding countryside, the displays in the Museum, the recreational facilities, and all other aspects which blend together to give you, the tourist, a pleasant and enjoyable visit.

We all sincerely hope you enjoy your stay with us and that you will come back to visit us again.

WENDELL GREENE,

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# VALLEY OF THE DINOSAURS

Prepared by DR. W. R. READ

A visitor approaching the city of Drumheller is suddenly confronted by a mile wide valley where the Red Deer river has excavated below the prairies of Central Alberta to a depth of nearly four hundred feet. Travelling from Calgary via No. 9 Highway the first intimation of an abrupt change in terrain occurs at Horseshoe Canyon Lookout ten miles southwest of the city of Drumheller. Horseshoe Canyon is only tributary to the Red Deer valley and the scenery here is but a preview of the magnificent vistas that await in the main canyon between Drumheller and Trochu ferry. The grandeur of the multicolored, sculptured walls of the valley, as viewed from the Dinosaur Trail between Drumheller and Munson ferry, is unexcelled elsewhere in Canada. Here are world famous Badlands of Alberta.

The Red Deer valley is the result of erosion. The Red Deer river has required only a few thousand years to carve the badlands, but in the process it has revealed a chapter in the history of the earth that was written in the rocks seventy-five million years ago and when deciphered by geologists rivals the best of science fiction.

## FOSSILS LIFT THE VEIL OF TIME

Life on our earth has passed through many stages between its birth in the remote past and its present day expression. Great races of creatures arose and flourished for many millions of years and became extinct leaving only their remains as mute evidence of their existence. These remains are called fossils and they comprise bones and tracks of ancient animals, as well as impressions of leaves and petrified wood buried in the rock of the earth's crust.

Although fossil remains were known to exist as early as 450 B.C., for many centuries they were deprecated as devices planted by the devil to delude man. Another conviction held was that fossils were "relics of that accursed race that perished with the flood." But by the turn of the 19th century a few pioneer students of the earth, geologists (the early geologists were more stone masons than scientists) noticed that a relationship existed between certain layers of rocks and the fossils which they contained. Each layer seemed to have its own characteristic plant and animal remains. These men began to sense dimly vast expanses of time punctuated here and there by profound changes in life, topography and climate. Slowly they began to piece together the petrified bits and pieces into a picture of the life of millions of years ago. Thus was born the science of paleontology, the study of ancient life. Paleontology is an adjunct of geology, the broader science that investigates the structure and history of the earth and in a practical way discovers and exploits all kinds of economic mineral resources including oil, coal, iron and gold and so on.

There are many things of interest in the Red Deer valley for the geologist. For the paleontologist the badlands are a veritable storehouse of fossils which is easily accessible to the amateur fossil hunter as well as the professional collector. A few hours spent exploring the coulees of the valley will prove stimulating and rewarding to anyone who follows the Dinosaur Trail and visits the local museum.

This earth is perhaps three billion years old. So far as paleontologists can tell the first living things appeared on earth about two billion years ago. For a long time after that, possibly one and a half billion years, the only animals were relatively insignificant creatures such as sponges, jellyfish, snails, clams, worm and crab-like beasts, but no animals with backbones appeared until about four hundred million years ago. These first animals with backbones were the fishes which were soon followed by creatures that could breathe air and spend part of their lives out of the water, in other words: amphibians, whose living descendants are the frogs, turtles and salamanders. A little later some amphibians became entirely divorced from their life in the water, developed dry, scaly skins and thus became the first reptiles.

The reptiles soon dominated the land and ushered in the Age of Reptiles. This age is known technically as the Mesozoic Era and lasted about 130 million years. It came to a close about 65 million years ago with the final extinction



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of the great dinosaurs and most of their lesser allies. Of the reptiles only the turtles, lizards, snakes, crocodiles and the tuatara have survived to modern times. The Age of Mammals in which we live followed the demise of the dinosaurs. The great Ice Age, of which we speak so glibly in terms of long ago, in fact occurred within the last million years and according to some is still with us.

Where in this long history do the rocks in the Red Deer valley fit and how did they come to be?

## GEOLOGY

The most abundant rocks in the valley walls are composed of alternate bands of black, brown, grey and white layers of coal, clay, ironstone, shale and sandstone. These rocks are called the Edmonton formation by geologists and the fossils they contain tell us that they date from near the end of the Age of Reptiles, a time known to geologists as the Cretaceous Period. In a few places light grey yellow cliffs can be seen above the darker colored Edmonton rocks and these belong to the Paskapoo formation which was laid down some 60 to 65 millions years ago at the beginning of the Age of Mammals. Still higher in the bluffs, right up to the prairie's edge and "on top" are yellow gravels, sand and silts which date from sometime in the great Ice Age or Pleistocene Epoch. These sediments are only a few thousand years old and evidently formed in lakes that lay upon the land when the broad glaciers were melting away. The regularly banded yellow silts which can be seen along the highway as it begins its descent towards Drumheller were deposited in old Lake Drumheller which is estimated to have covered an area of approximately eleven hundred square miles. Lake Drumheller was dammed by glacial ice that melted more slowly to the south, but when the ice dam finally disappeared the old lake was drained and the final sculpturing of the Red Deer valley commenced. This occurred only a few thousand years ago. The rim of hills at the prairie level are composed of sand and gravel that was dumped from glacial streams as the melting ice caused their channels to collapse.

What occurred between the end of the Age of Reptiles and the Ice Age is little known in the Drumheller district. Sediments probably continued to be deposited here off and on for the 65 million years of the Age of Mammals, but the glaciers so gouged the surface of the earth that they carried away mile after mile of more recent rocks. Thus was destroyed most of the record in the rocks except those from the very earliest times in the Age of Mammals, which are still preserved in the Paskapoo formation.

## THE EDMONTON FORMATION

The colorfully banded layers of the Edmonton formation were deposited by meandering rivers in shallow lakes and lagoons and flood plains. Layer upon layer of mud, clay, silt and sand piled up over thousands of years to a depth of hundreds of feet. In the ensuing millions of years these sediments were cemented and compacted into the hard rocks they are today.

It is a distinctive feature of these rocks that they contain large quantities of the mineral bentonite which is derived from the chemical weathering of volcanic ash. At times, thin but very extensive layers of white volcanic ash were apparently deposited directly in shallow bodies of water covering much of the Central Alberta and Saskatchewan region. This material called the Kneehills tuff in the Drumheller area is very hard and forms a thin white "cap rock" at the rim of Horseshoe Canyon. According to geologists the ash itself was evidently spewed out of volcanoes which erupted to the south in what is now the state of Montana.

Most of the sand and mud that forms the Edmonton formation was derived from the erosion of highlands to the west. The Rocky Mountains had begun to rise in the closing phases of the Mesozoic Era (Age of Reptiles) under the influence of what seems an almost unimaginable warping of the American continent. Off and on for hundreds of millions of years a vast inland seaway had joined the Gulf of Mexico and the Arctic Ocean across what now are the prairie states and provinces. Some deposits from this arm of the sea called the Bearpaw formation can be seen southeast of Drumheller where brown shales form the base of the stems of the Hoodoos at Willow Creek. Fossil

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oyster shells in the Edmonton formation are apparently derived from this inland sea which briefly inundated some of the lowlands at several times during deposition of the Edmonton sediments.

At the very end of the Age of Reptiles the warping of the continent combined with erosion to cause the final retreat of this great seaway from North America. By this time the last of the Edmonton rocks had been deposited.

The Edmonton formation is of great interest because of the wealth of dinosaur bones which it contains. But dinosaurs are not the only fossils in these rocks. Also present are remains of various less spectacular creatures including sharks, alligators, gars and other fishes, salamanders, turtles, lizards, crocodiles and an almost unbelievable sea-monster called a plesiosaur. At several places there are layers of ancient oyster shells and besides coal deposits there are remains of a great variety of plants and petrified tree trunks.

## ALBERTA 70 MILLION YEARS AGO

Scientific analysis of the geological and paleontological evidence afforded by the Edmonton formation and its fossils permits the following impressions of what Alberta was like some 70 million years ago.

Where flat prairie land now rises gradually toward the ancient Rocky Mountains a broad swampy delta formed along the edges of the inland sea that stretched north-westward from the Gulf of Mexico. Where the Red Deer river now cuts its canyon there were then broad and meandering streams with backwaters bordering on the stagnant, which in places produced swamps where vegetation decayed in the first stages of coal formation. These lowlands were periodically flooded and occasionally for several years at a time the sea drowned some of the river mouths. Wide savannas reached inland onto higher ground.

Where now temperatures range from 110 degrees above zero to 50 degrees below and the countryside is swept unmercifully by winter blizzards, the climate was then uniformly subtropical and the ground never froze in the winter. Where now trees worthy of the name exist only in sequestered places, then there lived a "forest primeval" composed of tall redwoods, cypresses, sable palms, plane trees, gingkos and others that today occur only in subtropical climates.

In this setting instead of herds of cattle, sheep and occasional families of antelope there lived hordes of armoured and duck-billed dinosaurs. The variety of these creatures is almost beyond imagination. Armoured dinosaurs resembling horned toads as big as trucks moved sluggishly about the countryside. Fleeter dinosaurs the size of ostriches ran about on long hind legs in search of seeds, flies, insects or perhaps eggs. Always in the background lurked the possibility of sudden crushing death administered by gigantic carnivorous dinosaurs which were among the most devastating destroyers nature has ever devised. Streams and lakes were populated, in addition to the ubiquitous duckbill dinosaurs, by crocodiles, turtles and fishes, many of which were possibly indistinguishable from their descendants in the present day everglades. And in the trees or wherever else protection could be had from the fearsome brutes of the reptile world, there lived the tiny possum-like creatures, "the advance guard" of the furry minions destined a few million years hence, to inherit the world.

## DINOSAUR DISCOVERIES

The most famous petrified remains found in the Drumheller Badlands are the dinosaur bones. While one may find abundant petrified wood, fossil shells, berries, cones and even whole beds of fossil oysters, it is the dinosaur remains that have made the area famous among paleontologists the world over.

In the summer of 1884, Dr. J. B. Tyrrell was dispatched by the Dominion Geological Survey to investigate reported occurrences of coal in the Red Deer river valley. While thus engaged he discovered the head of a petrified monster exposed in a hillside near Kneehill Creek. Dr. Tyrrell sent this and other specimens to Ottawa and Philadelphia for study, and as is usual in scientific research the results of the study were not published until several years afterwards. In 1897 the Drumheller district was visited by a paleontologist, Mr. Lawrence M. Lambe, of the Geological Survey of Canada. In 1910, Barnum

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Brown of the American Museum of Natural History of New York led the first organized expedition for dinosaurs into the valley between the Trochu ferry and the city of Drumheller. He returned in 1911 and in 1912 to complete his work in the Edmonton formation, and in the three years collected an exceptionally fine series of dinosaur skeletons and skulls. In 1912 also, the world famous fossil hunter, Mr. Charles H. Sternberg explored the area accompanied by his sons, Levi, Charles M. and George. On August 12 of that year, Charles M. Sternberg discovered a large duck-billed dinosaur skeleton on Michichi Creek which was later assembled at the National Museum in Ottawa and became the first dinosaur skeleton to be mounted in a Canadian museum. Although C. H. Sternberg continued to search for dinosaurs in the fossil fields of Canada for several years, he never returned to the Drumheller district. His three sons, however, conducted no less than thirteen expeditions in the general vicinity of Drumheller, Munson, Morrin, Trochu and Ardley. By far the most frequent visitor to the district was Dr. Charles M. Sternberg who between 1923 and 1947, conducted six expeditions into the valley on behalf of the National Museum of Canada.

As recently as 1955-56 a dinosaur skeleton was excavated by the National Museum of Canada near Munson ferry and although the specimens are perhaps less easily discovered now than in earlier years, there is no evidence that the supply of fossils in the valley is becoming exhausted.

Since the first discoveries were made three quarters of a century ago nearly thirty fairly complete dinosaur skeletons have been obtained from the Red Deer valley north of Drumheller. Many of these were new to science and have been duly recorded in technical literature that runs to many hundreds of pages.

The best collection of dinosaur skeletons and skulls from the Drumheller district may be seen in the Royal Ontario Museum in Toronto, the American Museum of Natural History in New York and the National Museum of Canada in Ottawa. Skulls and partial skeletons of other "Drumheller" dinosaurs are preserved in the Chicago Natural History Museum, the British Museum of Natural History in London, and in several North American and European university collections.

## DINOSAURS

Cold stone fossil beds tell us nearly all we know about the dinosaurs. These extinct reptiles however, were once the dominant wild animals throughout about 130 million years of earth history. The last of them died perhaps 65 million years ago when the warm-blooded mammals finally inherited the earth.

The first dinosaurs evolved from small alligator-like beasts some 200 million years ago. At first, the dinosaurs were small slender-bodied animals quite different from the gigantic behemoths of later times. The first dinosaurs were probably flesh-eating animals, but eventually some of these became more omnivorous in diet and later some of these became specialized to an herbivorous diet. The first dinosaurs were evidently bipedal animals, but when as a group they became heavier of body they tended to walk on all fours as their distant ancestors have done. A few dinosaurs, both of the herbivorous and carnivorous kinds, later became bipedal again; in fact it is not certain that the carnivorous dinosaurs ever passed through a completely quadrupedal stage in their evolution.

During the Age of Reptiles, the dinosaurs and their allies managed to become fitted for making a living in almost every conceivable fashion that was available on the earth of their time. For example, while dinosaurs ruled the land some other reptiles took to the sea and others even invaded the air spaces to become the well known Pterodactyls.

The greatest part of the Age of Reptiles had already passed before the Edmonton formation was deposited in Alberta. Most people think of dinosaurs as huge four-legged creatures with long necks and tails and tiny heads, but in fact this kind of dinosaur called sauropods had largely disappeared before any of the Canadian dinosaur beds were deposited. True sauropods still lived in the southern hemisphere and even in the southern parts of the United States (albeit in small numbers), but no remains of sauropods have ever been found in Canada, nor are they likely to be found here.

Many different kinds of dinosaurs however, did exist in the region now traversed by the Red Deer river. Those from the Drumheller district can be



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grouped roughly into the carnivorous and herbivorous kinds. As usual in nature there were fewer carnivorous than herbivorous ones and these consisted of huge bipedal beasts 35 feet in length and of small animals perhaps no larger than a good sized dog. Of the smaller varieties we know very little because their fossil remains are rare and when found consist usually of teeth and isolated broken bones. The larger carnivorous dinosaurs were exemplified by Albertosaurus which was an ancestor of the world famous Tyrannosaurus rex.

Albertosaurus had a short neck and body, a long tail, huge head with a mouth full of sabre-like teeth four inches long and powerful hind legs with feet which resembled those of a turkey. The front legs were by contrast so small as to appear practically without function.

Constructed along similar lines but more slender of body and only about nine feet in length was the ostrich mimic dinosaur called Struthiomimus. Its bone structure tells us that Struthiomimus was a true carnivorous dinosaur by descent but it had become adapted to another mode of life. Instead of the powerful jaws armed with fearsome teeth its feeding mechanism was weak and teeth had been replaced with a horny bird-like beak. Its neck was relatively long and slender. Its hind legs were long and slender. The front legs were longer in proportion than they were in its larger carnivorous colleagues. The food of Struthiomimus is somewhat of a mystery. Perhaps it consisted of fruits, berries, insects, eggs, either one or all. One thing is certain, it was a very agile and swift moving animal which resembled an ostrich without feathers.

The plant-eating dinosaurs can be divided into several groups including the duck-billed, horned, armoured and others.

The duck-billed dinosaurs were by far the most common animal of their day in the Drumheller district. One species called Edmontosaurus was nearly 30 feet long. It had a long tail, which was flattened from side to side, heavy hind limbs, short front legs and a moderately long and slender neck. Its head was not unusually small as dinosaur heads go and the jaws contained batteries of specialized teeth. There were perhaps a thousand or more teeth present in the mouth of a single animal, although only around two hundred of these were in use at any one time during its life. The other teeth were held in reserve and came into use as the ones above them were worn off. As the name implies, the duck-billed dinosaurs have a peculiar toothless snout which when viewed from different angles reminds one of the bill of a duck. These animals were presumably sluggish beasts which spent most of their time in pools of the great Edmonton delta, both in order to escape the fearsome Albertosaurus and also literally to take the weight off their feet. These animals weighed several tons and the bones were constructed so that probably they could not support the weight of the body on dry land for very long at a time. Usually, skeletons of the duck-billed dinosaurs are found lying on their sides with the

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head thrown back, the forelimbs dangling in front of the body, the tail extended out in a more or less straight fashion behind and the legs strongly flexed suggesting a swimming position. In many cases we have found impressions of the skin preserved in the rocks around their bones so we know that the hide of the duck-billed dinosaur was composed of scales which were arranged in various ornamental ways. We do not of course know anything about the color of the "skin" or of the coloration of any other dinosaur for that matter.

Edmontosaurus was not the only duck-billed dinosaur of this region. There were other, both larger and smaller, which had strangely developed heads. Whereas the bodies of the duck-billed dinosaurs were pretty much alike, the tops of the heads of the different species differ greatly from one another. For example, the head of Edmontosaurus was flat on top but some of its close relatives had greatly swollen foreheads and one had a long spike that projected backwards above the neck.

Typical of the horned dinosaurs were the swamp-dwelling creatures called Anchiceratops. This animal was not quite as large as an elephant but probably weighed a couple of tons. It walked on four massive legs of which (as in all dinosaurs) the hind ones were much longer than those in front. The tail was short for a dinosaur and was possibly carried off the ground. There was practically no neck, in fact some of the bones in the neck had solidified into a single mass in order to strengthen the support for the gigantic head. Anchiceratops and the other horned dinosaurs were unusual among dinosaurs in having heads of tremendous size. In Anchiceratops the head accounted for almost a quarter of the length of the animal's body. It consisted of a sharp hooked beak that resembled that of a turtle, a fairly long face and, behind, a broad sheet of bone formed an ornamental shelf of frill that projected over the shoulder region. There was a small horn on top of the beak above the nose and a larger one over each eye. The teeth resembled those of the duck-bill dinosaurs, but were less numerous. The jaws were extremely powerful.

Whereas the duck-billed dinosaurs were evidently defenceless away from the water, the horned dinosaurs presumably could give a good account of themselves in any encounter with Albertosaurus or his unfriendly relatives. For, not only did the bony frill behind the head protect the front part of the body from frontal attack, the horns bore at the unprotected belly of the great flesh-eaters, which it will be recalled walked on their hind legs with the front part of the body well elevated.

There were many different kinds of "horned" dinosaurs (some of which it may be noted did not have horns) but not many are found in the Drumheller area. A very small species has been found upstream from the town of Trochu and the ancestors of the famous Triceratops is known to occur in the Edmonton rocks near Morrin ferry.

The other great group of dinosaurs were the armoured forms. Imagine a modern day "horned toad" 20 feet long and five or six feet wide and you will have a fair idea of what these pre-historic tanks must have looked like in life. Their bodies were low and broad and supported by pillar-like legs, which instead of long slender toes and claws had feet that probably resembled large land tortoises of today with stubby hook-like ends of the toes. The upper side of the body was covered with a mosaic of horny plates and along the sides were curved spikes which became very large and heavy in the region of the shoulders. The heads of armoured dinosaurs were small and completely covered with thick bony plates above and on the sides. The tail was long and so stiffened by bony rods along the sides of the vertebrae that it was evidently rigid at least in its back portion. At the end of the tail were large almond-shaped chunks of bone which fitted together to form a club-like structure. This tail in life must have resembled a gigantic mace. One can imagine that such a creature was partly immune to attacks by Albertosaurus; when danger threatened it may simply have squatted down and swept its tail back and forth in a broad arc behind it. Conceivably the tail club could have cut the feet of a carnivorous dinosaur completely out from under him. In this connection it is interesting to note that many shin bones of carnivorous dinosaurs show the results of severe injuries during life.

Many armoured dinosaurs had their teeth greatly reduced in size and numbers and evidently depended on a horny beak and tough cheek pads to obtain their food which consisted probably of low, soft leafy plants.

All of these dinosaurs lived in or close to bodies of water. They were

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lowlanders. On higher ground there existed other dinosaurs about which we know very little because their carcasses seldom were buried where they could become fossils. One that is worthy of mention is the bony headed dinosaur, *Stegoceras*. The roof of the skull was composed of a great sphere of solid bone, the function of which is still a mystery to paleontologists. The skull bones are fairly common fossils because they were so solid they have resisted disintegration better than the rest of the skeleton which was a fairly delicate affair. The *Stegoceras* was not a large dinosaur, possibly a length of no more than three feet.

So much for the common dinosaurs of the Drumheller valley. There were others but we know very little about them. They were relatively insignificant in number. Many and varied ancestors of these Drumheller dinosaurs are found as fossils elsewhere in Canada. The famous *Triceratops* and *Tyrannosaurus* which are descended from dinosaurs from the Drumheller area are known to occur farther upstream on the Red Deer river. These animals were among the very last of the dinosaurs and as yet no very complete specimen of either has been discovered in Alberta.

## HOW ARE DINOSAUR SPECIMENS COLLECTED?

It is a popular misconception that the fossil hunter finds his bones by digging for them. Nothing could be more futile. The proverbial needle in the haystack would be much easier to discover than a dinosaur in the Drumheller valley if this were the method employed by paleontologists. Fortunately the fossil hunter has the assistance of Mother Nature and the processes of erosion expose the fossil bones to view in just the same way as it exposes the rocks which surround the fossils. When the paleontologist enters an area of erosion his eyes are glued to the ground, while he prospects for fragments of broken fossil bone that have been brought to the surface through the various processes of erosion. Usually, when such fragments are discovered careful investigation will lead only to the discovery of a piece of a bone; a vertebrae or two, possibly a leg, a foot, a skull, but only occasionally does such a prospect lead to the discovery of a complete skeleton. It may require many days, weeks or even months of tedious prospecting to discover a complete dinosaur skeleton such as those to be seen on display in many large museums all over the world.

At some places there occur accumulations of bones of dinosaurs and other animals piled helter skelter in a fairly restricted area. These deposits are known as bone beds and may not contain material that is suitable for museum displays. A well exposed bone bed of this type occurs east of Morrin ferry. There are others on the west side of the Red Deer river north of Munson ferry. These bone beds apparently resulted from the washing about of decaying dinosaur carcasses on the shores of ancient bodies of water and they indicate that for some reason a large number of animals died at approximately the same time.

Once a favorable prospect has been discovered a great deal of work in the form of physical labor is required to remove the specimen from its burial place to the museum. This may require excavation with shovels and picks. Sometimes even dynamite judiciously employed is brought into play. It may be necessary to remove tons of rock from above the skeleton in order that the paleontologist may uncover the bones and once the excavation has progressed to the point where the bones are almost exposed then the heavy tools are discarded in favor of such implements as small awls, hammers and chisels, whisk brooms and paint brushes and the like. The bones of the skeleton are outlined with these more delicate implements and as each new area of bone is exposed to the air it must be treated immediately with solutions such as shellac which will harden the bone and protect it against the drying effects of the atmosphere. This may sound strange if the bones are actually petrified or turned to stone, but as a matter of fact freshly exposed fossil bones are often most brittle and soft and the drying effects of the air produces very unfavorable results in many cases. Of course the bones cannot be completely freed from the rock in the field. This is a time consuming operation that can only be accomplished in the museum laboratory.

As soon as the bones have been fairly well exposed on the upper side, trenches a foot or so wide are dug all around the bones so that in effect the bones are left resting on a pedestal of the original rock. Then the bone exposed

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in the upper side of the pedestal is covered with wet tissue paper, and on top of the wet tissue paper are laid bandages made of strips of burlap dipped in plaster of paris and wrapped or in much the same fashion as a doctor would place a plaster cast on a broken arm. If the bones are large it may be necessary to emulate the doctor more closely by employing splints which are usually made of any sort of wood that can be obtained in the vicinity of excavation. As soon as the plaster jacket on the upper side of the pedestal has hardened the rock is cut away from the under side and the plaster jacket containing the bones and upper part of the pedestal is turned over and the same procedure is repeated on the under side. The result of this work is a fossil bone completely encased in a plaster of paris cast which, if it is properly made, should protect the bone during its transportation from the field to the museum and the bone should arrive at the museum in the same state of preservation in which it was removed from the ground. Once the fossil has been received in the museum laboratory the upper half of the protective plaster is cut away and the bone is again hardened and strengthened by the application of various solutions. The rock that still remains adherent to the bone is carefully chipped, scraped or ground off. The broken pieces of bone are removed and cleaned and then are fastened back together with various types of glue and plaster. In the case of long bones sometimes it is desirable to drill holes through the centres and insert iron rods, wires or some other means of strengthening the fossils internally and then they are put together with plaster. This procedure is referred to as preparation. After the fossil bones have been prepared they are then studied, identified and classified by the paleontologist. If they are of scientific interest the paleontologist usually prepares a highly technical report which is published in some professional journal and announces to the scientific world the discovery of a new creature or some interesting fact about an extinct animal that had not been previously known to science.

If the specimen is exceptionally good it may then be placed on display in a museum where the public as well as the scientist can take advantage of it and this is the way in which the magnificent dinosaur skeletons in many of the world's large museums have come to reside in exhibition halls. In mounting a dinosaur skeleton a tremendous amount of work is involved from a purely engineering point of view. Because the bones are extremely heavy and at the same time are exceedingly fragile it is necessary to support them on iron work or scaffolding which must be fashioned very carefully so as to fit the irregular configuration of the dinosaur bones and at the same time detract as little as possible from the skeleton itself. Mounting a large dinosaur skeleton in this fashion may require the complete efforts of one or two men for periods of two, three or even more years. If, as is usually the case the specimen is not completely represented, since part of the animal's skeleton may have been carried away before the carcass was buried and part of it may have been destroyed by erosion before the skeleton was discovered by the paleontologist, some missing parts of the skeleton may have to be reconstructed in plaster of paris. This is a quite legitimate solution to the problem because otherwise, even though the scientist may have a good idea of what the complete structure of the animal looked like, the laymen may not be able to understand the structure of the animal if, for example, the skeleton was mounted with only three legs and only the back half of the tail with nothing in between it and the rest of the body. So these missing parts are frequently reproduced in plaster using either bones from the opposite side of the same skeleton as a guide, or else using bones from skeletons of other individuals of the same or very closely related

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species. In this way the public is assured of the accuracy of the reconstruction, and need not fall prey to the sometimes heard exclamation in museums, "After all they make these things out of plaster." This is not the case!

### WHAT KILLED THE DINOSAURS?

It is impossible to state definitely what caused the extermination of the dinosaurs. It is also impossible to state whether a single factor was operative or a combination of many.

Perhaps the most general explanation would be that these great animals were unable to adapt themselves to changing conditions. They may have succumbed to other more progressive animals. They were cold blooded, sluggish, with a small and lowly organized brain in comparison to their bulk, which may have made it difficult for them to compete with more efficient warm blooded mammals which appeared at the end of the Cretaceous period. Small mammals could also have preyed upon their eggs.

There may have been other changing conditions in their environment such as a sudden climatic change, perhaps a flood, perhaps a suffocating blizzard of volcanic ash and gas. A change in food supply may have been an important factor and food supply change may have been brought about to some extent by alteration in climate which also could have affected the dinosaurs, but probably affected the type of vegetation. Perhaps the draining of the lowlands was another factor. The great problem in explaining the extinction of any group of animals lays in the fact that an explanation that would account for the extinction of any one animal or one small association of animals may not be sufficient to account for the extinction of the really great variety of features which actually occurred. There is no really good explanation of extinction that would account for the disappearance of the dinosaurs on land, the flying reptiles in the air and the marine reptiles in the water.

It is believed that a race or order can become old and weak in the same way as an individual. This is called racial senescence. This is often accompanied by overspecialization. During the closing years of the Cretaceous period the number of species and individuals gradually became fewer, although more highly specialized and gigantic. Large, specialized forms are easily exterminated if subjected to a change in habitat or food supply.

It should be borne in mind that these extinctions did not occur instantaneously or overnight, so to speak. They were long drawn out affairs which took probably millions of years to accomplish, that is speaking of the reptiles as a whole. Of course it was quite likely that local extinctions may have done away with all the dinosaurs in a specifically restricted area in a brief period of time.

If these animals' physiology was anything like that of the diving reptiles, just a simple hard freeze of two or three days duration would have been sufficient to kill them off. Certainly, too, a very brief period of exceeding heat would have accounted for the death of all the creatures that could not protect themselves from this heat, and this of course in the absence of water would have included practically all the dinosaurs, because after all it would be pretty hard for a dinosaur to crawl under a rock or dig a hole to get out of the direct rays of the sun, as modern reptiles and the little lizards in the deserts are able to do. As a matter of fact the lizards and snakes in desert areas (and this is where we customarily think of reptiles living today) are inclined to be nocturnal, coming out only in the cooler part of the day which is in early evening and in the early morning. In many instances the deserts are cold for them in the middle of the night and they again retreat under the rocks, where there is a degree of warmth. During the middle of the day when the sun beats down on the desert, no reptile can withstand this high temperature for very long. They lose control of their muscles, are unable to get out of the rays of the sun and simply lay down and "stew in their own juice."

Thus we may speculate along various interesting lines of thought. But with certainty we may say the day of the dinosaur was over as the Cretaceous period drew to a close, and the future so far as reptiles were concerned was to belong to the relatively small animals that we know today, the lizards, snakes, turtles and crocodiles.

WELCOME TO THE BADLANDS

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# A TOUR OF THE BADLANDS

By MARIAN SMITH

Welcome to Drumheller! We do hope you will enjoy your visit here. Don't leave without taking a trip over the Dinosaur Trail. You can spend a most interesting day here, taking in the uniquely beautiful scenery; seeing for yourself where complete skeletons of dinosaur were excavated, and in doing some exploring on your own in the Badlands.

As their name suggests, these are barren wastelands. Years of erosion have washed sand, clay and limestone down from the hills packing hard over the years, so that nothing grows thereon. By means of this gradual process, fossils lying buried in the hillsides are laid bare or washed down into the gullies, with each spring's runoff, thus presenting new possibilities of further interesting discoveries.

First stop is the Drumheller and District Museum, where a priceless heritage of prehistoric animal, plant and marine life is to be seen. Operated by volunteer custodians, the Museum is open from 9 a.m. to 9 p.m. every day during the summer months. There is a tourist information bureau at the Museum to help you and answer your questions.

Centrally located, the Museum is just off Highway 9 on 1st Street East. The highway follows the railway through town to 1st Street West, where it turns north for a few blocks before you come to "Dinny" standing guard over the approach to the bridge. Properly known as Tyrannosaurus Rex, he is a replica of the huge and terrifying creatures that roamed this continent millions of years ago.

Two blocks north of the bridge turn left where the sign says, "Start of the Dinosaur Trail." Don't miss the "Homestead," a newly opened Antique Museum featuring household and agricultural equipment used in the good old days by the pioneer settlers.

About five miles west along this road you will come to the "Biggest Little Church," sparkling white against its lonely background of dun-colored hills. Take care as you continue westward from here, as it's a winding road, through formations that seem to be part of another world.

There is a tremendous viewpoint from the top of Horse Thief Canyon in the middle of the West Drumheller oil field, where you can enjoy the spectacular beauty of the valley.

Next stop will be the Munson Ferry. Many enjoy the ferry crossing as there are only a few of these oldtimers left. It was suggested that it be replaced by a bridge, but so many objected that it was retained for its nostalgic value, and it is a novelty for many, especially kiddies, who may never have had a ferry ride.

There is a good spot for a picnic under the cottonwoods across the river at the Government Camp Grounds.

Many fossils have been found in this area as well as the complete skeleton of the Edmontosaurus dinosaur, which was taken out about ten years ago. You will find yourself prospecting too, whether experienced at fossil hunting or not. Each little side canyon offers fascinating aspects. Weird dolomite formations thrust skyward like molded statuary in mute testimony to the ravages of their sculptors: the winds, rains and frosts of countless centuries.

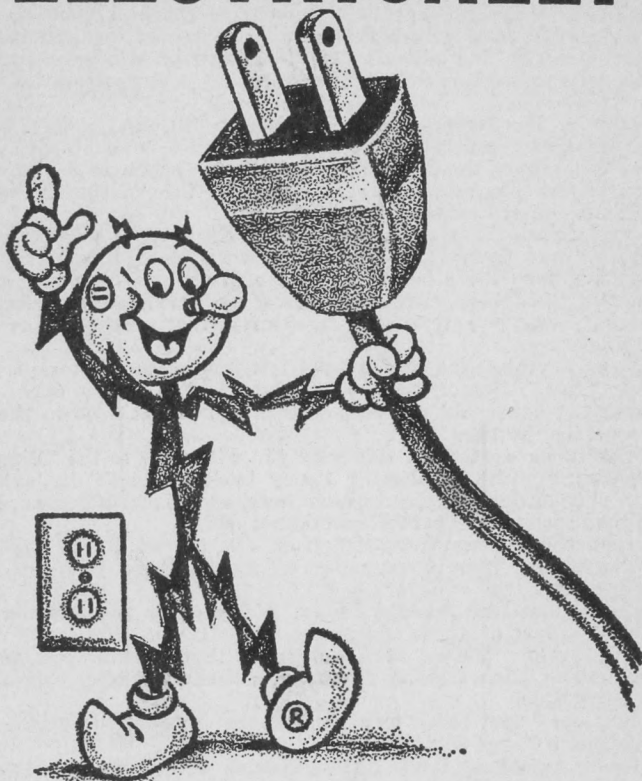
Follow the marker signs up the other side of the valley. This will take you into the excellent farming district of Orkney and another viewpoint looking out over the beautiful Red Deer valley. This road will take you down the south side of the valley close to the river, if you should like to try your luck at fishing.

Your next point of interest will be Newcastle Beach (watch for the sign) if you should like to go for a cool refreshing swim in a clean safe recreation area. There are picnic shelters here, and a miniature railroad and pony rides for the kiddies.

Back in town you may want to do some shopping and have some refreshments. You have only seen the western half of the Trail at this point. Follow the highway back until you recross the railroad, turn left and head east for Rosedale, another former mining town, where the swinging bridge, constructed to get the miners safely across the river to the old Star mine, is still swinging for those brave enough to balance their way across.

A few miles farther on you will come to the Willow Creek campsites

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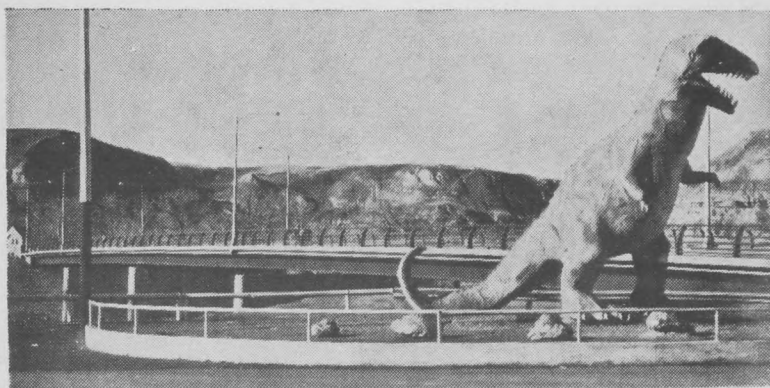
where the Hoodoos are an imposing sight. There are fossils here and huge petrified tree stumps and oyster beds.

Visit the last operating mines in East Coulee. The mine tipples are at the eastern end of the village, where there are also some huge dolomites to be seen.

Another scenic side trip is down the winding road to Wayne, through a deep, narrow canyon. Ten bridges (count 'em, kids, I may be wrong) cross and recross the Rosebud Creek in only four miles. The coulees beyond Wayne are rich in fossils, not so picked over as the more accessible spots. At one time, Wayne was a busy coal town with two mines operating right in its midst.

While we cannot offer you the glamorous aura of the federally subsidized mountain playgrounds, being just a small workaday centre, we are experiencing growing pains, partly because of the influx of tourists from all parts of the world. There are several good restaurants and stores here and accommodation is no problem, whether your choice is a hotel, motel or campground.

Bear in mind that, until a few years ago, Drumheller was strictly a mining town, with little time or funds for fancy frills. Becoming aware of their attractive surroundings and the harvest of fossils, many foresighted volunteers worked for years on the dream of a museum and other points of recreation and interest so that you and your friends can enjoy your trip back in time as you visit the Museum exhibits and tour the Dinosaur Trail. So long! See you next year!



Tyrannosaurus Rex greets the visitors to Drumheller at the bridge.

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# DRUMHELLER AND DISTRICT MUSEUM SOCIETY

## 1964-65

1965 marks the tenth year of operation of the Museum. Over the ten-year period the Museum has shown a steady growth in exhibits and in the number of visitors.

The Museum serves the following functions:

1. In co-operation with the Alberta Tourist Association it is the centre for distribution of tourist information for the Drumheller area.
2. The Museum displays are designed to interpret the individuality and environment of the unique Drumheller area. Planned visits of school classes continue to increase year by year.  
For the above reasons it is strongly recommended that visitors visit the Museum before touring the Dinosaur Trail and other points in the area. By so doing they will enjoy their visit to the full.
3. The Museum provides facilities for display, preservation and protection of objects that might otherwise be lost or destroyed.

In addition to the complete mounted skeleton of the duck-billed dinosaur *Edmontosaurus*, there are now the following displays:

GEOLOGY OF THE BADLANDS

THE INLAND SEA

THE PETRIFIED FOREST

COAL

FOSSIL COLLECTION OF

WM. R. FULTON

WHAT ARE FOSSILS?

JUNIPER CARVINGS OF

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BUFFALO

DINOSAURS (CLASSIFIED)

DINOSAUR HUNTERS

DUCK-BILLED DINOSAURS

HORNED DINOSAURS

CARNIVOROUS DINOSAURS

MISCELLANEOUS DINOSAURS

MAMMALS

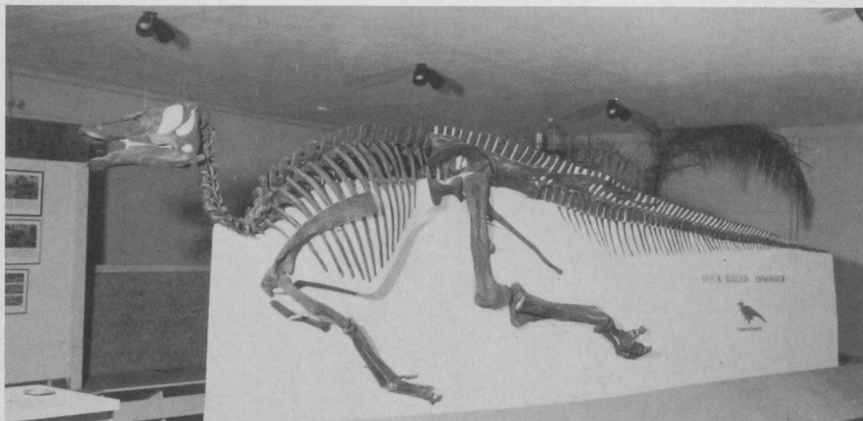
THE ICE AGE

INDIAN ARTIFACTS

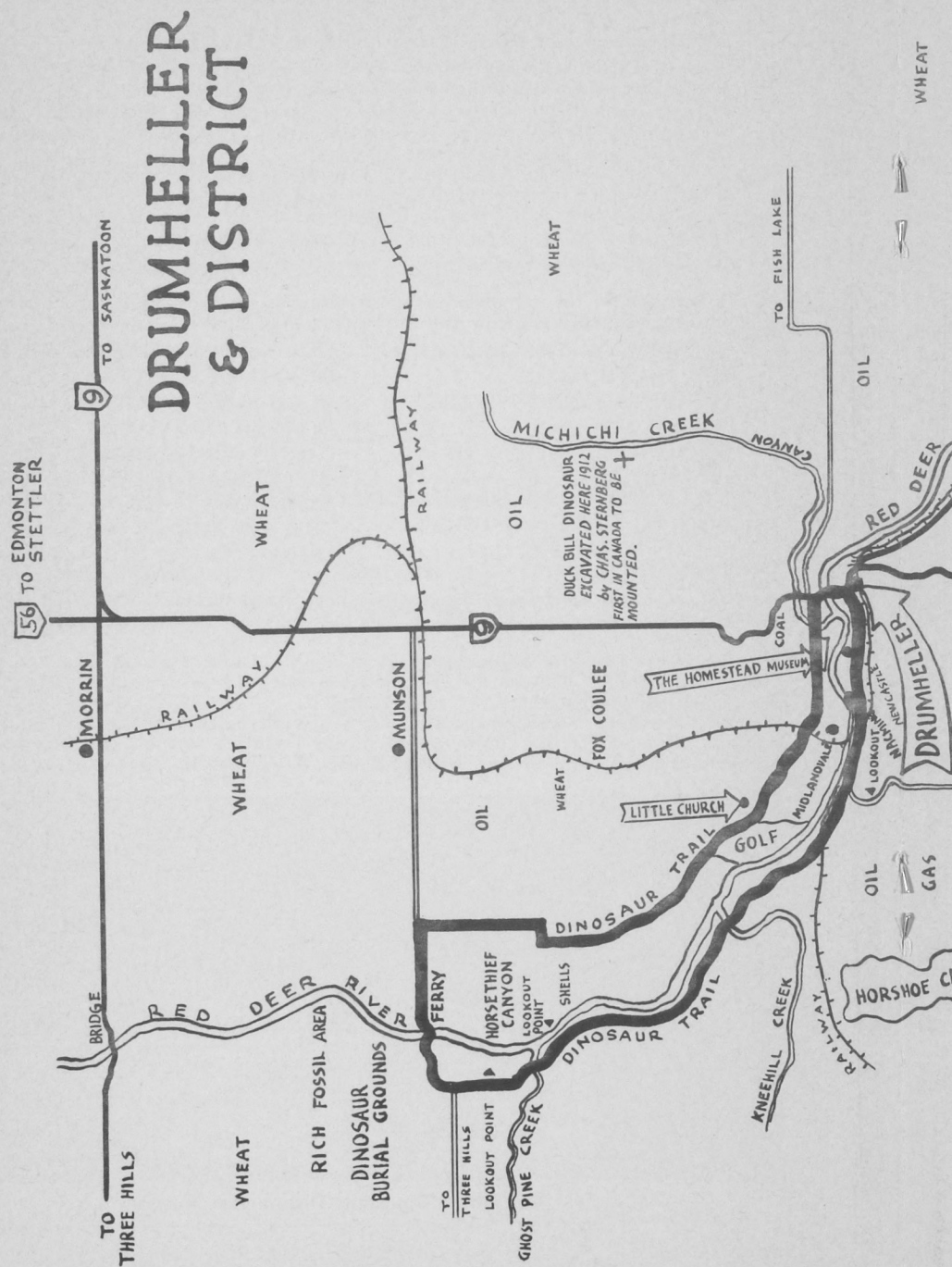
Also added in 1964 was a large chart portraying the GEOLOGY OF THE AGES. There are two displays of photographs of the Early History of Drumheller.

Being prepared for exhibit in 1965 is the skull and a partial skeleton of *Bison occidentalis*. This is a rare specimen and has been carbon dated at an age of over 10,500 years.

The Museum is constantly striving to improve, enlarge and revise its exhibits. Financially, the improvement in our facilities depends entirely upon the donations of our visitors. PLEASE BE GENEROUS!



Mounted Duck-billed Dinosaur, Drumheller Museum





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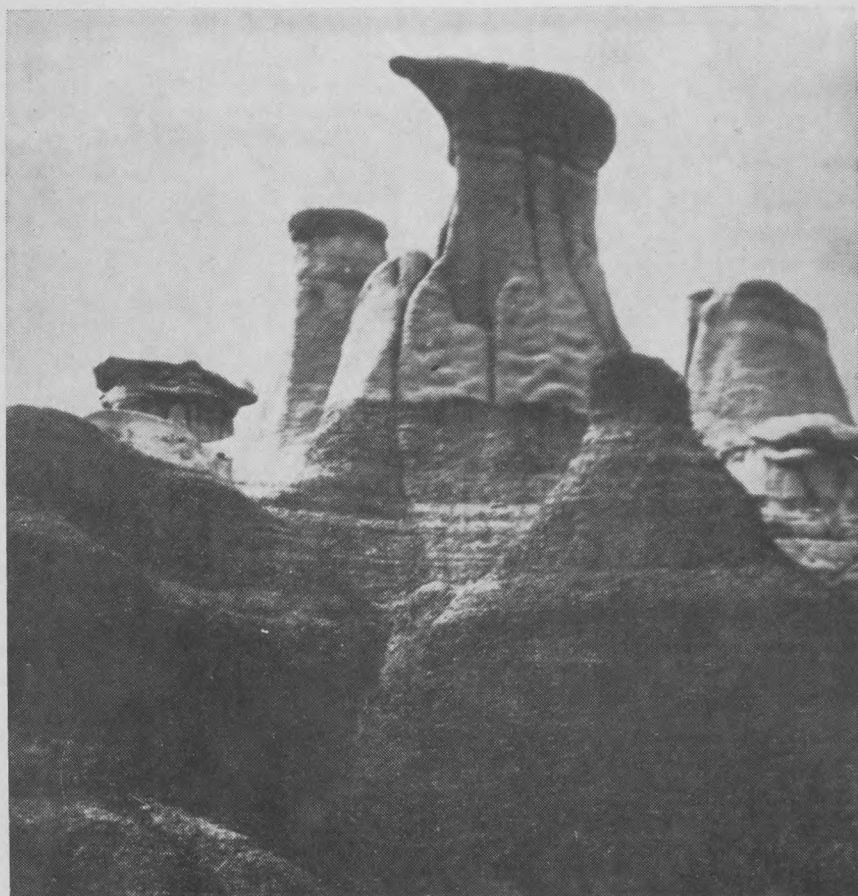
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## HOODOOS

The rock layers exposed in the Red Deer valley walls are composed of different materials such as sandstone, shale, clay, ironstone and coal. Since these rocks differ greatly in hardness some of them resist erosion better than others. The harder rocks are usually thinner than the softer ones in this particular region. When the hard layers are undermined by the erosional activity of wind, running water, freezing, thawing and so on, the harder layers tend to remain as protection for the softer rocks below. As erosion progresses however, the softer rocks and then the protective harder tops become separated from the adjacent rock masses and this often results in a series of gigantic "toadstool" structures that have been termed hoodoos. Hoodoos are a characteristic feature of badlands everywhere and may vary in size from tiny structures a fraction of an inch in height to massive pillars as tall as buildings. Some good examples of hoodoos can be seen at Willow Creek where resistant sandstone layers at the base of the Edmonton formation cap pillars of softer and more easily eroded shale of the Bearpaw formation.



The Hoodoos—Drumheller



*Welcome to the Badlands . . .*

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## DUCK-BILLED DINOSAUR EDMONTOSAURUS

The bones of the *Edmontosaurus* skeleton in the Drumheller and District Museum were discovered and collected by Dr. C. M. Sternberg, formerly of the National Museum of Canada, in 1923. They were found about six and one-half miles west of Munson in the east bank of the Red Deer river, some 150 feet above water level in Sec. 15, Twp. 30, Rge. 21, West of the 4th Meridian.

The skeleton is about average size for *Edmontosaurus*, or possibly a little smaller than average. In life the animal weighed perhaps four or five tons. The fossil bones weighed about a ton. As mounted, the skeleton is 30 feet long and is about 8 feet high. When the animal stood on its hind feet the head may easily have extended 14 feet above the ground.

*Edmontosaurus* is the common dinosaur in the Drumheller valley. Perhaps 90 per cent of all fossil bones seen in the badlands belong to this and related duck-billed dinosaurs. These fossils have been preserved by processes of petrification for about 75 million years. The bones still retain their basic shape, but are often crushed and distorted by tremendous pressures experienced in the rocks during and following fossilization. The original bones were altered chemically and all hollow spaces have been filled in by foreign mineral matter, usually various combinations of calcite and iron, and in some cases even quartz.

When the animal died its carcass was soon buried in wet sand where decay eventually destroyed the soft parts leaving only the bones. While this was happening the soft sand settled in all around the bones causing them to remain in their natural position. Ground water gradually seeped into the bones and there began to leave some of the mineral matter which it carried in solution. The amount of this material increased until the physical characters of weight, hardness and color had all been changed and the bones petrified. While this was happening additional sand and clay were deposited above the bones until a great thickness of sediments was built up and the sand and clays gradually changed into sandstone and shale. It was the weight of these sediments that crushed and distorted the bones. But it was also the great thickness of the rocks that preserved the bones for millions of years.

In fairly recent times the Red Deer river has eroded the Drumheller valley and in the process has exposed the fossil remains of countless dinosaurs. Occasionally a good specimen is found and called to the attention of experts in time to preserve it, but there is no doubt that most fossils fall victim to the rapid erosion to which the soft rocks in the Drumheller valley are subject.

*Edmontosaurus* was a fairly large duck-billed dinosaur. It lived in swampy environments on deltas along the edges of a great inland sea which extended across North America during the Age of Reptiles. Some of the rocks deposited upon these deltas are now exposed in the Drumheller Valley. Geologists call them the Edmonton formation. They represent a very brief span of time in earth history and record in their fossils only a glimpse of life toward the end of the Age of Reptiles.

*Edmontosaurus* like its many duck-billed relatives was a harmless creature whose only defence against the great predatory dinosaurs of the day was an ability to swim. The skeletons are usually found in a pose that suggests swimming and it is known from tracks and certain unusually well-preserved skeletons that the feet were webbed. The stiff tail—strengthened by long bony tendons along the spines—was flattened from side to side and was doubtless used for a rudder in the water as well as a counterbalance on land.

Impressions of the skin have been found in the rocks around some skeletons and these show that the hide was scaly as it is in reptiles generally.

We know nothing about the color of the animals, but we suppose that the large defenceless duck-billed dinosaurs lacked bright markings that would attract the attention of enemies. They may have had skin patterns that helped them blend into their surroundings and dark upper surfaces and lighter under surfaces that assisted them in controlling their body temperatures.

The duck-billed snout was covered by a long horny sheath and the fairly weak jaws contained hundreds of small teeth. These teeth were arranged in rows in such a way that when one tooth wore out it was immediately replaced with another. Such a method of replacement and the huge size of some of the duck-billed dinosaurs suggests that their life span was considerable, but no one has any idea of how long they lived. Some modern reptiles though, are

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known to live more than a hundred years, and it is suspected that some turtles have lived several hundred years.

Duck-billed dinosaurs were vegetarians and doubtless fed on soft plant material that must have been in copious supply in and around the swamps. The same materials provided the source for the coal of the Drumheller valley. It is not unlikely that most feeding was done in the water, for not only did this environment provide protection from the non-swimming carnivorous dinosaurs, it buoyed up the heavy bodies and literally took the weight off the dinosaurs' feet. These feet and legs were none too well adapted to carrying great weight around on land; the joints were composed of relatively soft cartilage or gristle.

Duck-bill dinosaurs may have laid eggs, but if so, no shells have been found. This could be because the shells were leathery and thus subject to decay, or perhaps at egg-laying time, the dinosaurs left their swamp homes and migrated into drier and higher land. There the eggs would not likely become preserved as fossils because there is little chance of rapid and permanent burial where drainage is rapid. Remains of very young dinosaurs are very uncommon and even animals half the size of this skeleton are rare.

The bones used in this display were removed from the rock, cleaned, mended and mounted by Harold L. Shearman at the National Museum of Canada in Ottawa. The work required more than three years.

The skeleton was mounted in several sections which were shipped to Drumheller for assembly. The shipment weighed 8,000 pounds, boxed and crated. The project was supervised by Dr. Wann Langston, Jr., Curator of Vertebrate Paleontology, National Museum of Canada.

Two questions frequently asked at the Museum are:

1. Why did so many dinosaurs die here?
2. How were the badlands and this deep valley formed?

Only during the last 500 million years have plants and animals produced hard parts capable of being fossilized. If you look at the Geological Time Chart you will find that dinosaurs were the dominant form of life during the 120 million years of the Mesozoic era comprising the Triassic, Jurassic and Cretaceous periods. This holds true on all the continents of the world. By the close of the Cretaceous the dinosaurs had been replaced by the mammals, and only in comparatively recent times did man appear upon this earth.

Now it's easy to see that the dinosaurs were deeply buried beneath the deposits of the following Cenozoic era, and with the exception of a few places in the world this holds true. The valley of the Red Deer river is one of these exceptions. During the Great Ice Age this part of Alberta was heavily glaciated, which is to say, the advance of the glacial ice cut away the Cenozoic deposits; leaving the rocks of the Late Cretaceous almost at the surface. As the ice melted, the water was added to the drainage flow from the mountains to the west, and this flow cut its way through the soft sediments in which the dinosaurs lie buried. Thus the exposures were created and our fossil wealth made easily accessible. Because these sedimentary rocks are soft they are easily cut and shaped by the sculpturing action of water, wind and frost. So it can be said that erosion shaped these Badlands as you see them and will continue to do so.

The valley walls in the vicinity of Drumheller are composed of alternate bands of black, brown, grey and white layers of coal, ironstone, clay, shale and sandstone. These rocks are called the Edmonton formation by geologists and the fossils they contain tell us that they date from near the end of the Cretaceous period.

Sometimes we are asked, "Have the dinosaurs all been found?" Quite obviously the answer is "no." As erosion continues its slow progress into the Edmonton beds more fossils will be exposed. Each new exposure may be a prospect leading to a new discovery.

Quite recently a partially exposed skull was found by members of the Museum Society. It was professionally excavated, collected and brought into the museum for safekeeping. It was subsequently identified by Dr. Wann Langston, Jr., of the National Museum as the skull of a *Pachyrhinosaurus Canadensis*, a type of horned dinosaur never before found in the Edmonton

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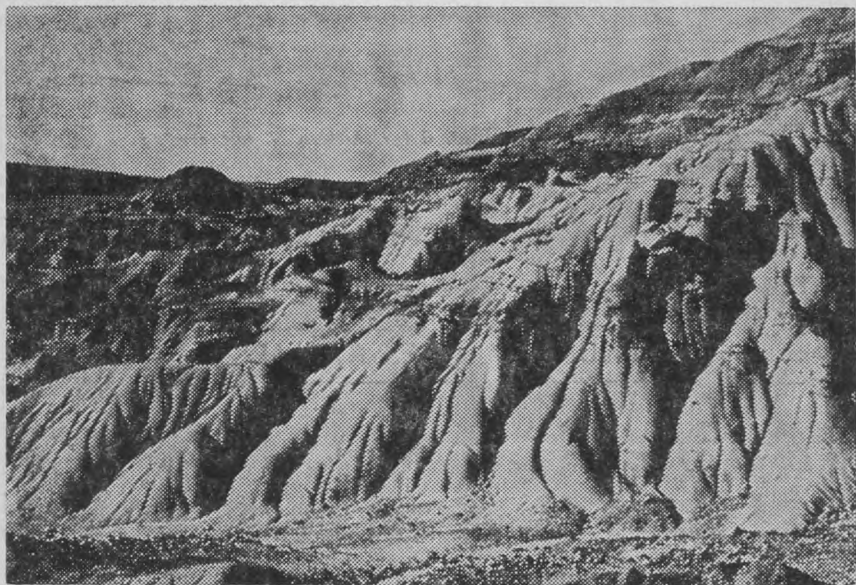
**Drumheller**



beds. Because of its scientific significance it has been released by our museum for study and reconstruction at the National Museum at Ottawa.

Had the skull remained exposed to the weather it would have eventually disintegrated and been lost. Had an enthusiastic rockhound found it and chipped away fragments, it would have been ruined, and a page in the geology of the Edmonton beds would have remained unturned.

We well know that with so many thousands of Badlands visitors roaming these hills and coulees in search of petrified bone and wood as souvenirs or as raw material for their lapidary work, there is some confusion as to what may be picked up and kept. The pieces that have eroded out of their original position and are lying scattered at the base of the cliffs or in dry washes where they have been carried by run-off are of no value scientifically but are highly prized by the finder. But if you should find an exposure of bone obviously lying in its original rock bed **DO NOT TRY TO DIG IT OUT. MARK THE SPOT AND PLEASE REPORT IT TO THE MUSEUM.** We will have the location thoroughly investigated. Your name will be recorded as having made the find and your co-operation will be greatly appreciated.



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# DRUMHELLER CHAMBER OF COMMERCE

## ACTIVITIES - 1965

By DON F. ANDERSON

1965 will mark the tenth year in which the Drumheller Chamber of Commerce through its Tourist Committee, has spearheaded the promotion of tourism in the Drumheller Valley. The Drumheller Junior Chamber of Commerce initiated the program in 1948.

New and more complete information sheets for the local guidance of tourists are in the planning stage; these sheets will incorporate information on both the City and the Dinosaur Trail area as well as outlining the attractions in the eastern part of the valley, and will be available at service stations, restaurants, hotels, motels, and from the main tourist information centre at the Drumheller Museum. About 8,000 colored brochures will be distributed to information outlets throughout Alberta, Saskatchewan and in the eastern part of British Columbia.

As in the past few years, we will be working closely with the Alberta Tourist Association and their allied outlets, so that tourist information for the whole of Alberta will be available at the Museum. The Museum will be open for extended hours starting with the May 2 weekend and stretching through to late fall. This year will also see the opening of the "Antique Museum" which is located just half a mile from the beginning of the Dinosaur Trail. In conjunction with its formal opening the Drumheller Chamber is co-operating with the Calgary Antique Car Club in its visit here on June 12th weekend; the Chamber also hopes to have a Concord Coach on hand on the same occasion.

The Tourist Committee will erect a number of signs in the city and on the tourist routes in the valley which will supply detailed information of the area through which the visitor is passing at the time. These should fit in well with pictorial records of the valley, both movie or still.

The City's 1967 Centennial plans provide for the improvement and enlarging of the camping and trailer facilities located behind the Memorial Arena. Initial steps on this project will be undertaken this year. Meanwhile facilities which are now there are quite suitable for large groups.

In order that all facets of the promotions we and other groups are planning this year the Tourist Committee will hold a "Hospitality Conference" to which all those persons who deal most often with visitors will be invited. This conference is designed to provide better service and more friendly relations between Drumheller and the travelling public.

Your committee hopes that these various steps will serve to make your visit in the "Valley of the Dinosaurs" a pleasant one.



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# THE DRUMHELLER DISTRICT

## Prehistoric Past, Immediate Past and Modern Present

By JOHN A. MACKAY

When one thinks of the Drumheller Badlands and the Drumheller District his thoughts should turn to three periods, the prehistoric past, the pioneer days, and the modern day present of the Drumheller District.

Much has been written about the prehistoric past by outstanding authorities, while President Dr. Wesley B. Read of the Drumheller and District Museum Society has written outstanding articles on the district's prehistoric past as well as the pioneer days of the district. His articles have been widely distributed by the Drumheller Museum and have found their way to all parts of the world. All such writings are of great educational value, as well as publicizing our district.

The purpose of this article is to recount several interesting incidents associated with the pioneers of the district from the viewpoint of the historic Badlands.

Let us start with the late Thomas Greentree, upon whose former land the City of Drumheller is located, and whose home in the old pioneer ranching days was the place where the pioneers received a real welcome as they passed this way. Mr. Greentree was a real son of England and a real Canadian.

As a member of the former Drumheller Canadian Club and a very active newspaperman, the writer well remembers an address delivered by Mr. Greentree when he was President of the Drumheller Canadian Club, in which address Mr. Greentree referred to the prehistoric specimens abounding in all parts of the Drumheller district and to the first Dinosaur Skeleton excavated by Professor Barnum Brown and which skeleton has been for years one of the big attractions in the Smithsonian Museum in Washington, D.C., U.S.A.

Mr. Greentree like the other pioneers of his time, noticed these peculiar bones and knew they were not buffalo or cattle bones. He wrote the geological department at Ottawa about them and requested that they send a representative to Drumheller. The geological department paid no attention to his request.

Meanwhile there was quite an influx of Americans, who bought land in this district from the Canadian Pacific Railway. One of these early settlers was intrigued by the strange specimens and began writing the geological department of the United States at Washington about them, in fact it is claimed that he sent a big box of specimens to Washington.

The upshot was that the United States geological department delved into the matter and Professor Barnum Brown and his party were sent to Drumheller to locate and excavate a dinosaur skeleton.

Mr. Greentree when describing the size of skeleton, stated it was the size of one side of the old Whitehouse Hotel and that it was the biggest skeleton ever taken out of the Drumheller Badlands.

This fact so annoyed Mr. Greentree that he again took matters up with Ottawa and managed to get the Geological Department to wake up and take notice. That his splendid efforts bore fruit is evidenced by the fact that Dr. Charles Sternberg (Sr.) and his sons Charles and Frank were sent out and

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they excavated different skeletons, which were shipped to Ottawa, and the authorities at Ottawa have been keenly interested ever since, and other paleontologists from Ottawa have been excavating skeletons since the Sternberg era, while today, Edmontosaurus dinosaur skeleton adorns the Drumheller Museum, thanks to the good work of Dr. Wann Langston Jr. and his associates.

Then, a group of Calgarians headed by the late Lieut.-Col. J. H. Woods, publisher of the Calgary Herald, financed the excavation of another dinosaur skeleton which they later sold to the British Museum at what it cost them. This is quite a story in itself. The skeleton is on display in the British Museum.

The original signs, which appeared at the top of the Twin Hills hill and the Munson Hill were the brain children of Past President Harold H. Lewis of the Drumheller District Chamber of Commerce, the writer, who was the secretary of the Chamber at the time and Chance Lehman, the sign artist now living in Edmonton. These signs had a cement footing in which dinosaur specimens were worked in while the uprights and crossbar on which signs hung were made from electric light poles supplied by the Canadian Utilities.

When signs were erected, the Chamber of Commerce invited the late Honorable W. H. Fallow, then Minister of Public Works to come to Drumheller and unveil them. An unveiling ceremony was held at the Twin Hill sign, where quite a crowd gathered. The designs of original signs were copied by the Provincial Government as is shown by the large direction signs. Of course the original signs were taken down when No. 9 paved highway was built but the present signs carry practically the same writing as the original signs. Post-card pictures of the original sign on the Twin Hill road with the scarlet-coated Mounties on each side were very popular, while young lovers had their picture taken while standing on each side of the sign. Mr. Fallow addressed a dinner meeting of the Drumheller Chamber of Commerce held in the evening in the Hotel Alexander assembly room. During his address, he surprised the gathering by telling the oldtimers that he was a Drumheller district oldtimer as he as a boy spent his summers at his uncle's ranch in the Drumheller district. He was intrigued by the specimens he saw as he travelled about the area on his pony and took specimens back home with him.

Mr. Fallow promised every support in making this area a Provincial Dinosaur Park while he had already approved of the plan for a park sent him by the Drumheller Chamber of Commerce. He figured he would request the Provincial Government to spend some \$10,000 a year for five years to make a real park area, reached by roads leading into it. However the second world war commenced and shortly after the end of the war Mr. Fallow died and his plans were never carried out. Had he lived, things might have been different some years ago.

For years before the advent of the Drumheller Museum and Dinosaur Trail as one sees it today, the Museum Committee of the Drumheller Chamber of Commerce carried on, with the office of the writer who was secretary of the Chamber of Commerce being the Information Bureau and where tourist literature was distributed.

Reverend A. B. Schrag, former minister of Drumheller Knox United Church, with the assistance of the Drumheller Chamber of Commerce prepared a number of picture slides of scenes of the Drumheller Badlands and not only showed them in Drumheller but in Calgary and Edmonton in which city he showed them at the University of Alberta. He gave lectures on the Drumheller Badlands using slides to illustrate them on his visits to Calgary, Edmonton, and other points.

The Drumheller Rotary Club staged a special show in the Napier Theatre, the show taking the form of an illustrated lecture by Dr. Charles Sternberg (Jr.) on the Drumheller Badlands. This entertainment was greeted by a large audience.

There was the late W. R. Fulton's splendid collection, which was viewed by thousands over the years, while Mr. Fulton personally conducted many tourists and visitors through the Badlands, while he was one of the outstanding authorities on the Badlands and specimens. He had his own cutting and polishing machines, while during his later years added the hobby of making figurines. The late Dr. Frank Sandercock had a splendid collection and also had his cutting and polishing machines and what is known as the black light which showed the stones of the Valley in vivid colors. Part of Dr. Sandercock's

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collection is on display in the Museum, having been donated to the Drumheller School Board, who later donated it to the Drumheller Museum.

Then the Senior and Junior Chambers of Commerce conducted Jaycee groups and other groups through the Badlands, while the Rotary Club when the District Governor paid them an official visit always took the Governor to the Badlands and called at the late Charles Jungling's farm home adjacent to the Badlands to inspect Mr. Jungling's fine display. The Junior Chamber of Commerce purchased the Jungling collection and later donated it to the Drumheller Museum where it is on display.

Geoffrey Anderson, whose display is at the Museum, was an avid specimen hunter and did his part in taking tourists through the Badlands, while he became quite an authority on specimens. He still takes a great interest in the Drumheller Museum.

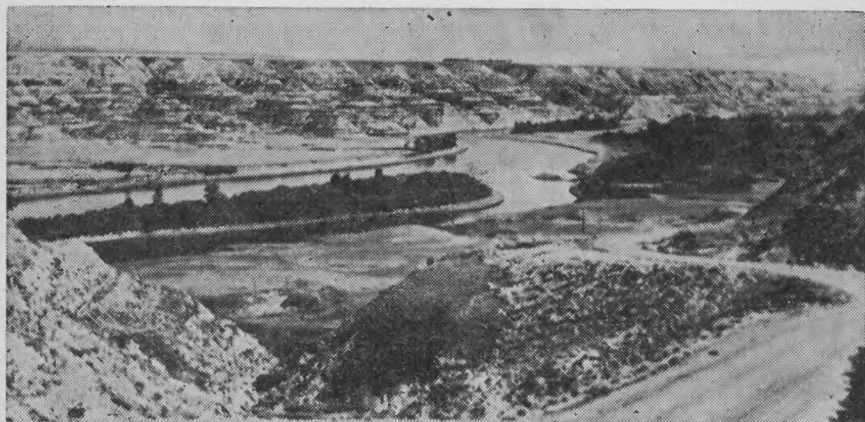
Harold Lowe, who spent some six or seven years with the Sternbergs when they were locating and excavating dinosaur skeletons and specimens, was the Chamber of Commerce official guide for some years, before he left for British Columbia, and conducted many a party through the Badlands. Harold had a certain charge for his services, but the tourists he conducted were so pleased that they would hand him a ten dollar bill and tell him to keep the change.

William G. Hodgson of Dorothy made the Drumheller district famous, when he developed into a very fine art the making of figurines from the juniper root gathered from this district. His figurines were sold in New York and London, England at several hundred dollars each and were in great demand. Mr. Hodgson was an inspiration to two or three younger men, who developed the art to the extent that their figurines were eagerly sought after at \$50.00 and upwards each.

Then followed the making of dinosaur models and other things by various other people.

Much more could be said of the many things worthy of note, which occurred before the Drumheller Museum was started and the Dinosaur Trail was marked out and a guide service from the Tourist office in the Museum was started.

However, the purpose of this article is to show that many fine people carried the torch and did their best to keep the Drumheller Badlands before the visitors from all parts of Canada and many parts of the world. Many have passed on but the torch now carried by the Drumheller and District Museum Society and the Drumheller District Tourist organization was passed to them by the pioneers of the movement that the tourists and visitors and our own citizens today know as a flourishing undertaking.



View of Drumheller Valley

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Pulverized coal is burned to produce steam, which in turn drives two 7,500-kilowatt Parsons turbines, to provide electricity for modern living for thousands of the utility company's customers. An additional standby unit has a capacity of 2,500 kilowatts.

The power plant is located in the city, on the south bank of the Red Deer river.

Generation of electricity in Drumheller dates back 50 years, starting with a 25 horsepower unit installed in 1916, by the North West Engineering and Supply Company. Service in the early days was provided from sunset to sunrise only, and it wasn't until 1919 that 24-hour service was introduced. During this year the company was reorganized and became the Drumheller Power Company.

The Drumheller Power Company was sold to the Union Power Company February 12, 1923, and the growth of a major power development began.

During 1925 a transmission line was built to the towns of Munson and Morin, and another to Wayne. These were the forerunners of a vast network of lines through east-central Alberta.

The Union Power Company was acquired by Canadian Utilities, Limited in 1935. In the years that followed transmission lines were continued north to take in Lousana, Delburne and Ardley, and east to Erskine. A loop was completed, from which power could be served to Stettler and district either directly north of Drumheller or via Carbon and Three Hills. Similarly the Three Hills area could be served by way of Stettler from Drumheller.

The system continued to grow in the fifties, reaching east from Hanna as far as Youngstown and Oyen, and then to Alsask, Acadia Valley and Empress.

A milestone of progress was reached by the company in 1954, with the construction of a power plant on the Battle River, about halfway between Forestburg and Halkirk, housing a 32,000 kilowatt coal-fired generator.

The capacity of the Battle River station was doubled in 1964, with the addition of another 32,000 kilowatt coal-fired unit. Plans are on the drawing board for again doubling the capacity of this plant, which is the largest in the company's system. A 75,000 kilowatt unit is scheduled to be commissioned in June, 1968.

In contrast to the small isolated power plants located in Alberta's major centres of population 30 or 40 years ago, the province is today covered by a vast network of power lines, built by investor-owned companies, reaching east and west from border to border and extending north 620 miles.

Co-ordination of the generation and distribution of electric power, under government regulation and control, is achieved through the interconnection of all the major plants, both municipal and investor-owned.

The wisdom of having a province-wide system of power interchange was dramatically illustrated during the severe winter of 1964-65, when Calgary Power Ltd. experienced a breakdown of a generator in their major plant at Wabamun, Alberta. The resultant shortage of power in the company's system was alleviated by a supply of energy from the plants of Canadian Utilities, Limited, and several municipalities, transmitted by way of the grid system.

Canadian Utilities, Limited, generates and distributes electric power in several large areas of Alberta, and has a subsidiary company, The Yukon Electrical Company Limited, providing electric service to the city of Whitehorse and ten other communities in the Yukon.

An associate company, Northland Utilities Limited, provides electric and natural gas service in Alberta's Peace River country; the town of Jasper; Dawson Creek, B.C.; Hay River in the Northwest Territories, and Uranium City, Saskatchewan.

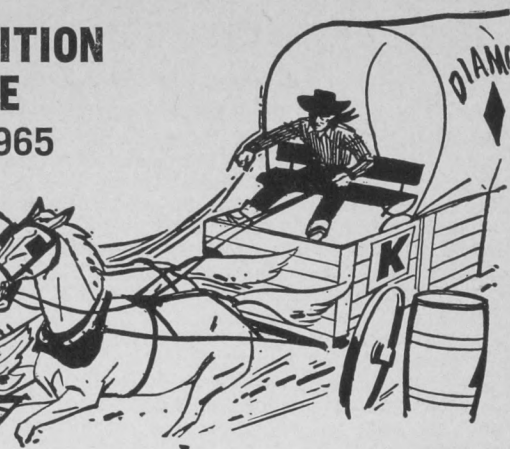
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# THE CHAMBER OF COMMERCE WELCOMES YOU

On behalf of the members of the Drumheller and District Chamber of Commerce I wish to welcome you to the Drumheller Valley. To the tourist who is visiting Drumheller for the first time, I can assure you that you have a real treat in store. To the tourist who is returning to Drumheller, welcome once more. May your stay in Drumheller be just as pleasant as your previous one.

The Drumheller and District Chamber of Commerce is this year celebrating its forty-seventh year of service to this community. Many changes have taken place in the Drumheller valley during those 47 years, and Drumheller today has developed into a modern city with the conveniences of a much larger centre.

Take a leisurely stroll through Drumheller's main business district. Notice the new and modern look on many of Drumheller's stores. Notice the fine window displays, the modern styles—notice also the variety of services available in Drumheller. Browse through the various stores throughout the city. The ladies will find that the stores here carry a complete line of ladies' wear in the very latest fashions. Men will find the clothes of their choice in any of the many men's wear stores. Drumheller grocery stores and supermarkets compare with the big city stores and prices are as low as in any of the stores in Alberta.

Drumheller has many fine restaurants and coffee shops conveniently located throughout the city. These restaurants serve a variety of good wholesome meals in clean and modern surroundings.

Drumheller is noted for its fine churches and there is a church of almost every denomination in the Drumheller area. Be sure to attend church at least once while in Drumheller, you will be glad you did.

There is recreation and sport of every description in the Drumheller area. During the winter months you can attend some of the best hockey in Alberta at the Drumheller Memorial Arena. For the curler Drumheller has a fine new curling rink. You can skate in the arena or toboggan on the hills surrounding the city. A new bowling alley is now open for the bowling enthusiast.

In the summertime, you can take a refreshing swim in the Drumheller Rotary Club Swimming Pool or for the youngster who is just learning to swim there is the wading pool or the learner's pool now in operation. Baseball and fastball are played frequently in the John Anderson Memorial Park or the fastball diamonds in the city. The new nine-hole championship golf course with grass greens and fairways, located on the banks of the Red Deer river opposite the Little Church, will be ready to serve you.

For variety take a trip out to the Newcastle Beach on the western outskirts of the city. Here you can sunbathe on the sandy beach of the Red Deer River or take a dip in the tepid water of this river.

For a change of pace, pack a lunch and climb the hills surrounding Drumheller. Here you will find interesting prehistoric specimens, petrified wood, etc. Go ahead, take a souvenir, but please leave some for the tourist who will follow you. Take a trip on the Dinosaur Trail, see the oyster beds, the oil wells, visit the Little Church. East of Drumheller see the "dolomites" and walk the swinging bridge. All these sites are within a few miles of Drumheller and offer the photographer some of the finest pictures he has ever taken.

The fisherman is not forgotten. Fish along the banks of the Red Deer river or visit the stocked dams. Ask at the service station or restaurant, the courteous staff will direct you.

For accommodation Drumheller offers fine motels and excellent hotels and for the camper there are convenient campsites both in the city and on the outskirts. There are many Alberta Government picnic sites in the area.

It all adds up to a new exciting holiday with the convenience of modern and clean stores with a variety of reasonably priced articles.

Once again I wish to welcome you to Drumheller. May your stay be a pleasant one and return again whether it is for just a night, a weekend, or a full holiday.

E. A. TOSHACH, President.

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Just a few miles outside of the fossil-famous city on a stretch of the well-graveled road known as "The Dinosaur Trail," this unique place of prayer sits as a symbol of man's faith in the God of creation.

By the time that "The World's Largest Little Church" was officially opened on Wednesday, July 9, 1958, the project was one which belonged to the entire community. Donations of land, electricity, moving, money, insurance, paint, recordings, fixtures, etc., and even a bell for the steeple, coming from a host of interested individuals, groups and companies, made it such.

Advertised to accommodate ten thousand people, six at a time, the chapel record showed over 36,000 visitors had paused within the sanctuary during the first ten months of its existence.

A distinct honour was paid the Little Church later that fall when Alberta's late Lieutenant-Governor the Right Honourable J. J. Bowlen officiated at the bell-hanging ceremony as the Canadian Pacific Railway Company donated a locomotive bell to be hung in the miniature steeple. General Superintendent for the Alberta district, Mr. D. M. Dunlop, represented the company and spoke of the changes brought our nation as diesels replace the steam engine, thus making the signal of the bell unnecessary for rail traffic but still desirable for calling worshippers to the place of prayer.

As each year passes, more and more visitors pause to meditate—so many, the threshold was worn out and a new one put in to replace it. Now the new one is showing signs of many feet passing in and out, and we will be pleased to replace as many as will wear out.



Photo by Vogue Studio, Drumheller



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# FOR MEN ONLY (?)

By BILL DOWSON

Perhaps while you're reading this Dad, you're lying under a blue sky, surrounded by green grass and the warm summer wind of the valley is whispering through the thick foliage of our famous cottonwoods along the river.

Just for a moment, imagine that the sky is grey and overcast with a ceiling of about 800 feet. Imagine huge grey and black cloudbanks driving south ahead of a chill November wind, which rustles the dry brown grass, and ripples the surface of the slough in front of you. You crouch down lower into the collar of your heavy canvas coat, tug at your cap to get the ear-flaps a little lower and you shift the cold blue barrel of your shotgun along the crumbling earth edge of the pit in which you sit. Then, out of the corner of your eye, you catch the hand signal of the man on your right—you cock an ear to the sky, lift an ear-flap, hold your breath and listen. And high above, on the very edge of the storm, louder than the wind in the rushes, you hear the scalp-tingling honking of a flight of Canada geese. Now you're crouching on your haunches, shotgun ready. Your dog has heard the fabulous birds and sits quivering in the pit, ears erect, tail pounding on the hard frozen earth. Then the khaki-clad arm of the shootmaster pokes itself out of the rushes and you hear him yell "Shoot!"

This scene is re-enacted every year in the Drumheller district during the game bird season and is very familiar to fellows in this part of Alberta.

But suppose you make your home in Eastern Canada, or in a portion of the United States that doesn't offer goose hunting opportunities like this? Dad, have you ever thought about coming back here in the fall to get in on a goose shoot with the boys? We'd love to have you, and there are plenty of fellows in the area who would be tickled to take you out with them after a bag of birds. This area offers some pretty wonderful birds too—Pheasant, Canada Goose, Prairie Chicken, Partridge, Hungarians and of course ducks of all kinds from Mallards to Butterballs.

Our game warden, whose office is located in the Provincial Building, just across the street from our City Hall, can fill you in on all the details, and give you license prices, regulations and bag limits and directions. The same fellow would be pleased to give you any information you might need if you'd care to hunt through the Valley for Mule or Whitetail Deer or Antelope.

Like I say, we'd love to have you back Dad, if you care a whole lot for hunting. We'll even find somebody to pluck and freeze your birds for you, and Drumheller is within easy driving distance of the finest game bird flyways in North America, which streak over towns like Consort, Coronation, Cereal and many more.

Today, when you have a minute, slip downtown and have a chat with our Fish and Wildlife man. Then when you get back home, get a bunch of the boys together, split costs and head back to the Big Country where the birds are the greatest. I can guarantee you Dad, you've never in your life experienced anything like a Big Country goose shoot. Or a day on the prairies pheasant hunting. Unless, of course, you've been here before.

Hotel accommodations are more economical in the fall too, and your hosts will take care of you like a king.

Dad, if you find it economically impossible to get in on a goose shoot at James Bay, or if you're from a part of the U.S. that's getting just a little crowded with folks who don't tolerate bird hunting, come on back and see us this fall.

Join the hundreds of fellows from Eastern Canada and the United States that head for the Big Country every fall to hunt our wonderful birds. I know Dad, it'll be an experience you'll never forget.

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# "THE HOMESTEAD" ANTIQUE MUSEUM

By BILL DOWSON AND FRANCIS PORTER

"The Homestead" is a must on your list of "sights to see" in the Drumheller valley. Located one-half mile west from No. 9 Highway on the Dinosaur Trail.

The Homestead is an eight-acre museum development immediately south of the Trail, dedicated to the preservation of the Big Country's interesting past. It can easily be recognized by the sign and the huge white and red dome building.

The Homestead is the creation of a small group of local men who were interested in restoring, preserving and displaying articles from pioneer days to present and future generations. Working together in a group known as the Big Country Antique Museum Ltd. these men have been able to acquire hundreds of items and to display them for your interest and enjoyment at the Homestead.

A great deal of work has gone into the collection and restoration of the many articles on display at the Homestead and the men involved in this venture are kept busy the year round working on newly acquired items. After seeing those in the museum in operation, working in their homes and on their farms on articles intended for display at the Homestead, one can readily see that this is an institution that will continue to expand in the future as steadily as it has grown in the past.

Included in the display at the Homestead are early automobiles, steam and gasoline engines that rumbled across the Big Country many years ago breaking the sod on what was to become some of the best wheat growing country in North America. You'll see a wondrous array of firearms, rifles, shotguns and handguns. One of the finest collections in the world. Among this collection are revolvers that once swung from the hips of gunfighters, rifles that have killed buffalo, weapons that won the West rest alongside those once owned by long departed Redmen who tried to defend their country against the encroachment of the white man.

You will see the various instruments, machines and tools used in the coal mining industry which mined millions of tons of coal in this valley. The largest domestic coal field in the British Empire. The Homestead itself is sitting on top of the old Hy-Grade workings, formerly one of the largest mines in the valley.

The Homestead is probably the closest thing to a time machine you'll ever see. A stroll through the amazing collection of antiques will take you back through the years to the earliest pioneer days of this Big Country. You will see ancient farm and ranch implements, sleighs, wagons, and other means of travel that in days gone by carried laughing, singing families to spend an evening with the neighbors. You can see spinning wheels, washing machines, lamps, clocks, musical instruments, household furnishings. A wonderful collection of photographs from the early days of the Big Country. You can actually listen to old recordings played on the same machines that brought music into the pioneer homes.

For those who prefer things of a military nature there is an outstanding display of badges, medals, ribbons, weapons, and gear. Indian relics and artifacts are there for all to see.

Nearly every item in the Homestead is workable. As a matter of fact, if one of our older pioneers were to return to this earth, he would feel right at home at the Homestead on the Dinosaur Trail, surrounded by so many of the things he had in his own home so many years ago.

Your entire family will long remember your visit to the Homestead, for to step through the gate is to step back into time, to see and touch those things which belonged to the pioneers of the Big Country.

One visit will not be sufficient because the museum is a living, growing thing. Day by day the men who have brought into existence this project are adding to the display so that even though it may be old there will always be something new.

# THE HOMESTEAD

## Antique Museum

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### APPRECIATION

I wish to thank the advertisers, the Alberta Government Travel Bureau, and the City of Drumheller for their support in making the 1965 issue another success.

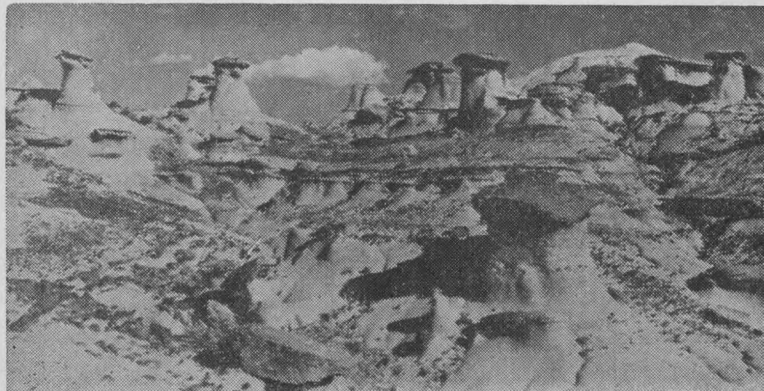
The reading material supplied by various organizations and individuals has provided much authentic and interesting information of the Badlands which has resulted in a tremendous increase in tourism, and much study of the prehistoric past.

The circulation is now greatly improved. The Alberta Government Travel Bureau, besides meeting local requirements, supplies its tourist bureau in Los Angeles and Canadian Government tourist bureaus in San Francisco, Chicago and New York. The Alberta Tourist Association has charge of the Alberta circulation and is showing wonderful results. The Drumheller and District Museum Society uses many books, as it comes in contact with tourists from many countries. The advertisers meet many tourists and appreciate having books available to give to those seeking information.

The advertisers are giving their support for the benefit of the tourist. Please support them!

T. B. McFARLANE,  
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